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SCIENTIFIC REVIEW

A Systematic Review on the Synoptic Operative Report Versus the Narrative Operative Report in Surgery

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Abstract

Background Proper documentation is an essential part of patient safety and quality of care in the surgical field. Surgical procedures are traditionally documented in narrative operative reports which are subjective by nature and often lack essential information. This systematic review will analyze the added value of the newly emerged synoptic reporting technique in the surgical setting.

Methods A systematic review was conducted to compare the completeness and the user-friendliness of the synoptic operative report to the narrative operative report. A literature search was performed in EMBASE, Ovid MEDLINE, Web of Science, Cochrane CENTRAL, and Google Scholar for studies published up to April 6, 2018. The Newcastle–Ottawa Scale was utilized for the risk of bias assessment of the included articles. PROSPERO registration number was: CRD42018093770.

Results Overall and subsection completion of the operative report was higher in the synoptic operative report. The time until completion of the operative report and the data extraction time were shorter in the synoptic report. One exception was the specific details section concerning the operative procedure, as this was generally reported more frequently in the narrative report. The use of mandatory fields in the synoptic report resulted in more completely reported operative outcomes with completion percentages close to 100%.

Conclusions The synoptic operative report generally demonstrated a higher completion rate and a much lower time until completion compared to the traditional narrative operative report. A hybrid approach to the synoptic operative report will potentially yield better completion rates and higher physician satisfaction.

Introduction

In the current medicine, all healthcare providers are obliged to properly document the care services provided. Within this requirement lays the composition of the operative note, comprising the essence of a surgical intervention and an imperative part in the continuity of care [1]. For decades, the narrative operative report (NR) has been used in this manner. This reporting method, however, is subjective by nature and often lacks essential information [2]. Given the fact that proper documentation is an essential part of patient safety and quality of care, many in the surgical field have experimented with or even have implemented synoptic reporting (SR) as a substitute. The word *synopsis* is derived from two ancient Greek words: σύν (*sún*, "with or whole") and ὄψις (*ópsis*, "view") and can be interpreted as a concise description of—in this case—a surgical procedure. An SR provides summarized documentation containing predefined leading criteria of the surgical procedure, which can effortlessly be completed in

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computerized templates. This synoptic way of reporting can also be achieved by providing easily comprehensible aide-mémoires. By adding quality of care indicators to this documentation method, these factors can be monitored efficiently without the need for double entries in a separate report. A good example of an electronically stored SR can be found in a study by Vergis et al. [3] focusing on Roux-en-Y gastric bypass.

Worldwide, over seven million patients suffer major complications following surgery every year. One million of these patients will die during or immediately after surgery as a result. Around half of these adverse events are potentially preventable [4]. Checklist usage in surgery results in thousands of patients' lives being saved each year. One of the best-known examples is the 19-item WHO Surgical Safety Checklist which was developed to decrease errors and adverse events and increase teamwork and communication [5]. This checklist reduced morbidity and mortality rates by more than one-third across all participating hospitals.

Earlier publications determined the lack of available information in the traditional reports. Wauben et al. demonstrated that NRs in laparoscopic cholecystectomy contained fewer essential procedural steps compared to what could be seen on operative video recordings [2]. Another study on laparoscopic cholecystectomy concluded that cases with bile duct injury contained fewer key elements of the report than those without bile duct injury, a phenomenon likely caused by surgeons tending to focus more on reporting unusual events rather than reporting the essential steps of the operation [6]. Apart from this explanation, it is plausible that, due to medicolegal concerns and fear of litigation, surgeons may, consciously or not, omit some part of the operative report when intraoperative complications occur. Furthermore, several studies reported improved efficiency [7], higher patient acuity level [8], higher physician satisfaction [9], and reduced administrative costs [10] in SRs. However, the extent of the superiority of SR and the ideal construction of the operative report remain unknown.

This systematic review evaluates the completeness and user-friendliness of the SR and the NR in the surgical setting.

Material and methods

The study protocol was registered in the International Prospective Register of Systematic Reviews (PROSPERO, http://www.crd.york.ac.uk/prospero), prior to the start of the systematic review, with registration number CRD42018093770.

Systematic literature search

A systematic search was performed in EMBASE, Ovid MEDLINE, Web of Science, Cochrane CENTRAL, and Google Scholar for studies published up to April 6, 2018, comparing SRs to NRs. There was no limit in date of publication. The search was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and limited to manuscripts written in English [11]. The complete search strategy is shown in "Appendix."

Article selection and data extraction

Two investigators (ÖE and FWvdG) independently reviewed articles using a standardized extraction form (Microsoft Excel—Microsoft Corp., Redmond, WA, USA). Disagreements were resolved through consensus or by consulting a third investigator (JFL). Studies were excluded if no comparison was made between SR and NR or when the intervention was used in a non-surgical setting. Specific types of articles were excluded: no available full-text, non-original articles, surveys, case reports, animal or cadaveric studies, guidelines, protocols, conference abstracts, letters to the editor, replies, and editorials. Study parameters included: first author, publication year, study design, comparison method, surgery type, NR type, SR type, use of mandatory fields in the SR, number of cases, completeness of reporting, and time until completion and extraction of the report.

Risk of bias assessment

We utilized the Newcastle–Ottawa Scale (NOS) to grade the risk of bias of each included article [12]. The NOS comprises eight items, categorized into three groups: selection of study groups, comparability of groups, and ascertainment of the outcome of interest. A maximum of four points can be assigned to "Selection," two points to "Comparability," and three points to "Outcome." Stars were awarded for each item to depict the quality of each study. Studies of the highest quality can be awarded up to nine stars.

Outcomes

The primary outcome was reporting completeness with respect to the total number of reported variables in SRs and NRs. The secondary outcome was user-friendliness which was divided into time until completion and readability of the report.

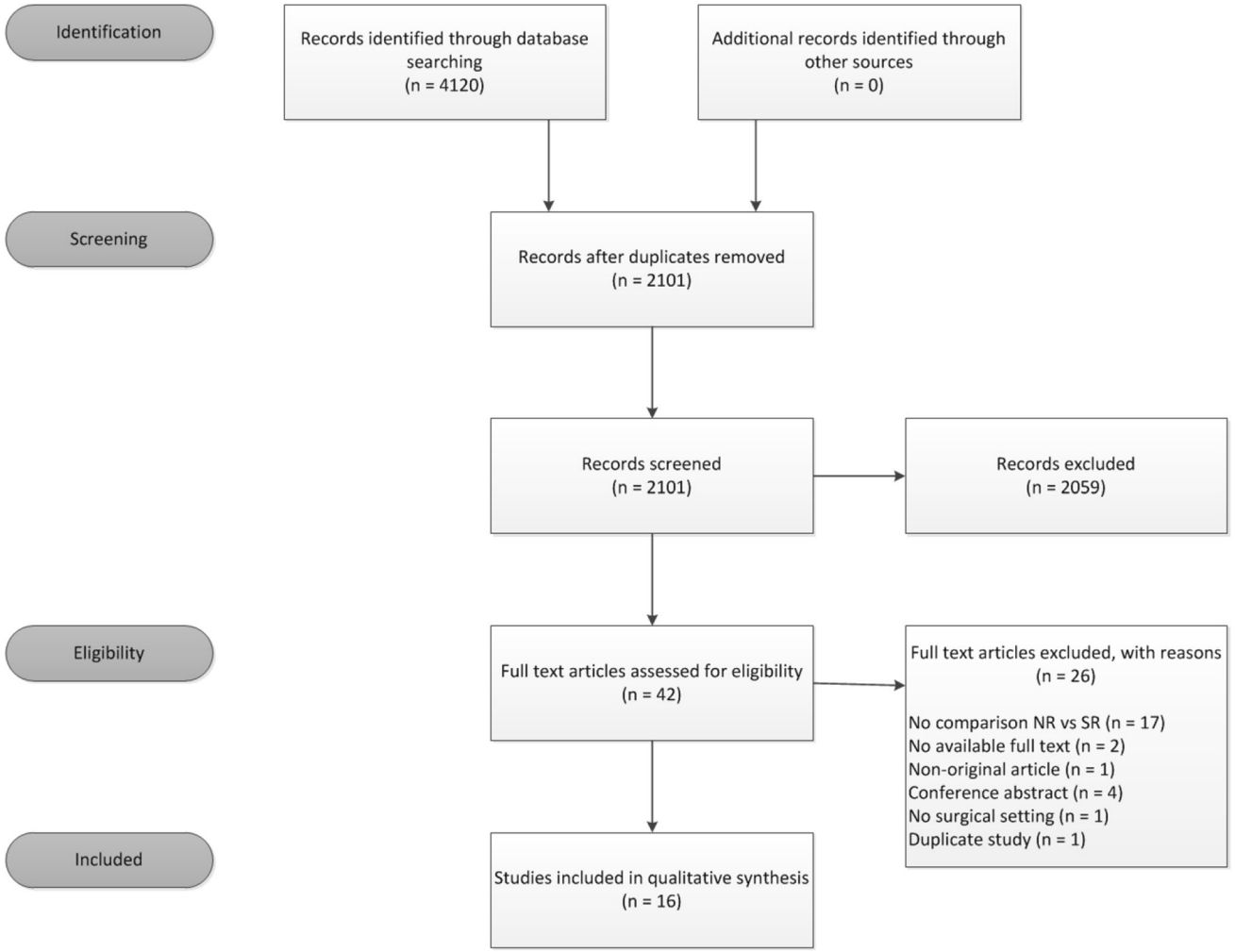

Fig. 1 PRISMA flow diagram of the study selection process

Results

Literature search

The initial search resulted in 4120 articles. After deduplication, 2101 studies were screened based on title and abstract. A total of 2059 articles were not relevant for the reviewed question. The eligibility of the remaining 42 articles was assessed based on full-text review, of which 16 met the inclusion criteria [13–28]. The study selection process is depicted in Fig. 1.

Study characteristics

Table 1 summarizes the study characteristics, and Table 2 reports the study results. In total, 2496 cases were present in the NR group and 1688 cases in the SR group. Eight studies compared retrospective cohorts to prospective cohorts, five studies compared prospective cohorts, and three studies compared retrospective cohorts. NRs were predominantly dictated (56.3%), whereas SRs were primarily available as electronic template (68.8%). Two studies utilized mandatory fields in their SRs.

Quality of the included studies

The NOS demonstrated that 93.8% of the studies earned above two stars for the Selection item, 18.8% of the studies earned above one star for the Comparability item, and 37.5% of the studies earned above two stars for the Outcome item (Table 3). These results suggest that nine studies [16, 17, 19–24, 28] could be considered of good quality and seven studies [13–15, 18, 25–27] of moderate quality.

Table 1 Study characteristics

Author	Year	Study design	Comparison method	Surgery type	Type of narrative operative report	Type of synoptic operative report	Mandatory fields in SR	Number of cases (control)	Number of cases (intervention)
Abbas et al. [13]	2016	Before–after	Retrospective versus prospective	Laparoscopic appendectomy	Typed	Other	No	43	57
Anderson et al. [14]	2016	Before–after	Retrospective versus prospective	Transurethral resection of bladder tumor	Not described	Other	No	428	325
Chambers et al. [15]	2009	Before–after	Retrospective versus prospective	Thyroidectomy	Dictated	Electronic template	Yes	271	133
Edhemovic et al. [16]	2004	Before–after	Retrospective versus prospective	Rectal cancer surgery	Dictated	Electronic template	Yes	40	40
Eng et al. [17]	2018	Retrospective	Retrospectively	Breast cancer surgery	Dictated	Hardcopy template	No	772	110
Gur et al. [18]	2012	Prospective	Prospectively	Breast cancer surgery	Dictated	Electronic template	No	60	60
Harvey et al. [19]	2007	Retrospective	Retrospectively	Laparoscopic cholecystectomy	Dictated	Hardcopy template	No	102	119
Hoffer et al. [20]	2012	Prospective	Prospectively	Kidney cancer surgery	Dictated	Electronic template	Yes	97	158
Hussien et al. [21]	2015	Prospective	Prospectively	Trauma surgery	Typed	Hardcopy template	No	50	50
Maniar et al. [22]	2014	Before–after	Retrospective versus prospective	Colon cancer surgery	Dictated	Electronic template	No	80	80
Maniar et al. [23]	2015	Before–after	Retrospective versus prospective	Rectal cancer surgery	Dictated	Electronic template	No	97	97
Park et al. [24]	2010	Before–after	Retrospective versus prospective	Pancreatic resection	Dictated	Electronic template	No	102	107
Rudra et al. [25]	2015	Retrospective	Retrospectively	Trauma surgery	Not described	Hardcopy template	No	24	24
Shayah et al. [26]	2007	Prospective	Prospectively	Otorhinolaryngology	Not described	Hardcopy template	No	100	100
Stogryn et al. [27]	2018	Prospective	Prospectively	Roux-en-Y gastric bypass	Not described	Electronic template	No	100	100
Thomson et al. [28]	2016	Before–after	Retrospective versus Prospective	Laparoscopic cholecystectomy	Not described	Electronic template	No	130	128

Table 2 Study results

Study parameters[a]	Author	Year	Narrative report (mean %)	Synoptic report (mean %)
Overall completeness	Abbas et al. [13]	2016	66%	94%
	Edhemovic et al. [16]	2004	45.9%	99%
	Eng et al. [17]	2018	45%	60%
	Gur et al. [18]	2012	66%	94.7%
	Hoffer et al. [20]	2012	68%	92%
	Hussien et al. [21]	2015	After introducing a standardized printed proforma, an overall significant improvement in the studied parameters was noticed ($p<.0134$)	
	Maniar et al. [22]	2014	31.7%	64.6%
	Maniar et al. [23]	2015	32.2%	71.1%
	Park et al. [24]	2010	59.6%	88.8%
	Stogryn et al. [27]	2018	64.0%	99.8%
Identifiers	Hussien et al. [21]	2015	Range 18–100%	Range 26–100%
	Rudra et al. [25]	2015	Range 0–100%	Range 20.8–100%
	Shayah et al. [26]	2007	Range 46–98%	100%
Perioperative information	Gur et al. [18]	2012	General and preoperative sections underreported in NR compared to SR ($p=.004$) also for intraoperative sections ($p=.001$)	
	Harvey et al. [19]	2007	Range 95–100%	Range 14–100%
	Maniar et al. [22]	2014	Significantly higher scores on the patient–provider discussion and laparoscopic cases sections	Significantly higher scores on both preoperative evaluation and operative care data
Operative details	Eng et al. [17]	2018	57%	59%
	Harvey et al. [19][c]	2007	The use of a gallbladder retrieval bag (63.0%) The size of the operative trocars (58.0%)	The use of a gallbladder retrieval bag (57.8%) The size of the operative trocars (55.9%)
Postoperative recommendations	Abbas et al. [13]	2016	95%	100%
	Hussien et al. [21]	2015	100%	100%
	Rudra et al. [25]	2015	Range 25–100%	Range 83.3–100%
	Shayah et al. [26]	2007	94%	100%
	Thomson et al. [28]	2016	95%	100%

Table 2 continued

Study parameters[a]	Author	Year	Narrative report (mean %)	Synoptic report (mean %)
Time until completion[b]	Edhemovic et al. [16]	2004	–	5:59
	Hoffer et al. [20]	2012	2:36	2:04
	Park et al. [24]	2010	–	4:00 ± 1:36 SD
	Stogryn et al. [27]	2018	4:50 ± 0:50 SD	3:55 ± 1:26 SD
Time until extraction[b]	Harvey et al. [19]	2007	2:36	2:04
	Maniar et al. [22]	2014	4:01 ± 1:14 SD	2:32 ± 0:44 SD
	Maniar et al. [23]	2015	4:48 ± 1:32 SD	2:45 ± 1:36 SD

[a] Mean percentages unless otherwise specified

[b] Time values are given in mean time (minutes:seconds)

[c] No statistically significant difference

Completeness of reporting

Overall completeness

Studies focusing on rectal and colon cancer surgery demonstrated that the range of retrieved information from SRs was 64.6–99.0% compared to 31.7–45.9% from NRs [16, 22, 23]. Breast cancer surgery showed similar results ranging from 60 to 94.7% for SRs and 45 to 66% for NRs [17, 18]. Studies covering laparoscopic appendectomy, kidney cancer surgery, pancreatic resection, and Roux-en-Y gastric bypass presented rates ranging from 88.8 to 99.8% for SRs and 59.6 to 68% for NRs [13, 20, 24, 27]. Necessary reporting items concerning transurethral bladder tumor resection significantly improved from .5 to 27% when surgeons were directed to consult a 10-item checklist before surgery and while entering the operative report ($p<.001$) [14]. Reporting compliance in laparoscopic cholecystectomy showed an improvement from 53% compliance in the first month of SR implementation to 67% compliance over the final 2 months of their study period [19]. Overall NRs in oncological thyroidectomies documented the presence/absence of tumor invasion in 27% of the cases, completeness of resection in 3%, and tumor size in 29%, whereas these were recorded in 100% of the cases in SRs ($p<.001$) [15]. Other studies consistently showed higher overall completion rates in SRs [21, 25, 26, 28].

Completeness of subsections

Patient and surgeon identification, operation time and date, and operative diagnosis are examples of identifiers. One study demonstrated that prior to implementation of an operative note template, median completeness of identifiers was 81.65% (range 0–100%) [25]. After implementation, a median completeness of 100% (range 20.8–100%) was obtained. Surgeons performed suboptimally at recording the assistant's name (82%), the operative diagnosis (46%), the incision type (87%), and the type of wound closure (83%) [26]. 100% compliance in most identifiers was observed after provision of a printed aide-mémoire of a "Good Surgical Practice" guideline. An exception was that 18% of surgeons reported the surgery time and that surgeons were tended to report the surgery type in an emergency setting, but not when the procedure was performed electively.

The perioperative phase is the time period describing the duration of a patient's surgical procedure. In laparoscopic cholecystectomies, most perioperative and operative data were more completely reported in the SR (range 95–100% in SR vs. range 14–100% in NR) [19]. In colon cancer surgery, SRs were associated with significantly higher scores on both preoperative evaluation and operative care data [22]. NRs were also associated with significantly higher scores on the patient–provider discussion and laparoscopic cases sections. A prospective study to breast cancer operations concluded that surgeons underreported general and preoperative sections of the dictated report compared to the same items in the SR ($p=.004$). This was also the case for intraoperative sections ($p=.001$) [18].

In breast cancer surgery, technical operative details were completely reported in 59% of SRs and in 57% of NRs [17]. These technical details were divided into important and less important details. This division in subgroups

Table 3 Newcastle–Ottawa Scale

Author	Year	Selection								Comparability of cohorts (adjusted for confounders)			Outcome						Total score
		Representativeness of exposed cohort		Selection of nonexposed cohort		Ascertainment of exposure		Outcome not present at baseline					Assessment of outcome		Sufficient follow-up duration		Adequate follow-up		
Abbas et al. [13]	2016	A	★	A	★	A	★	A	★	C			D		A	★	A	★	6
Anderson et al. [14]	2016	A	★	A	★	A	★	A	★	C			D		A	★	A	★	6
Chambers et al. [15]	2009	A	★	A	★	A	★	A	★	C			D		A	★	A	★	6
Edhemovic et al. [16]	2004	A	★	A	★	A	★	A	★	A (operator function) B (procedure type)	★	★	B	★	A	★	A	★	9
Eng et al. [17]	2018	A	★	A	★	A	★	A	★	A (operator function) B (procedure type and number of reports)	★	★	B	★	A	★	A	★	9
Gur et al. [18]	2012	C		A	★	A	★	A	★	C			D		A	★	A	★	5
Harvey et al. [19]	2007	A	★	A	★	A	★	A	★	B (procedure type)		★	A	★	A	★	A	★	8
Hoffer et al. [20]	2012	A	★	A	★	A	★	A	★	B (operator who used both NR and SR)		★	D		A	★	A	★	7
Hussien et al. [21]	2015	A	★	A	★	A	★	A	★	A (operator function)	★		D		A	★	A	★	7
Maniar et al. [22]	2014	A	★	A	★	A	★	A	★	A (surgeon matched)	★		A	★	A	★	A	★	8
Maniar et al. [23]	2015	A	★	A	★	A	★	A	★	A (surgeon matched)	★		A	★	A	★	A	★	8
Park et al. [24]	2010	A	★	A	★	A	★	A	★	A (resection matched) B (procedure type)	★	★	C		A	★	A	★	8
Rudra et al. [25]	2015	B	★	A	★	A	★	A	★	C			C		A	★	A	★	6
Shayah et al. [26]	2007	D		D		A	★	A	★	C			C		A	★	A	★	4

Table 3 continued

Author	Year	Selection				Comparability of cohorts (adjusted for confounders)	Outcome			Total score
		Representativeness of exposed cohort	Selection of nonexposed cohort	Ascertainment of exposure	Outcome not present at baseline		Assessment of outcome	Sufficient follow-up duration	Adequate follow-up	
Stogryn et al. [27]	2018	A	★ B	A	★ A	★ B (procedure type)	★ C	A	★ A	★ 6
Thomson et al. [28]	2016	A	★ A	★ A	★ A	★ C	A	★ A	★ A	★ 7

Score interpretation

1–3 stars: low quality, 4–6 stars: moderate quality, 7–9 stars: high quality

The complete interpretation of the letters (A–D) can be found on http://www.ohri.ca/programs/clinical_epidemiology/nos_manual.pdf

showed that important technical details were completely reported in 69% of SRs versus 58% of NRs. Contrarily, less important technical details were reported less frequently in SRs (44% SR vs. 55% NR). Furthermore, non-technical operative details showed a larger difference between both groups, favoring SR (61% SR vs. 29% NR). Consistent to latter study, NRs of thyroidectomies routinely included nonessential information [15]. In laparoscopic cholecystectomy, operative details were more completely reported in the SR. Two exceptions were the use of a gallbladder retrieval bag (57.8% vs. 63.0%, $p=.45$) and the size of the operative trocars (55.9% vs. 58.0%, $p=.75$) [19].

Improvements in the recording of postoperative instructions after laparoscopic appendectomy in the SR were not significant [13]. Prospectively reviewed trauma surgery reports also showed no completion rate differences in the postoperative plan sections for both SR (100%) and NR (100%) [21]. In a retrospective trauma surgery study, SRs yielded a median overall completion rate for postoperative instructions of 95.8% (range 83.3–100%), whereas NRs had a median completion rate of 54.2% (range 25–100%) [25]. In otorhinolaryngology, postoperative instructions were recorded in 94% of NRs. After the introduction of an aide-mémoire, 100% completion of this section was detected [26].

User-friendliness

The time until completion for SRs in rectal cancer surgery was approximately 6 min [16]. SRs for pancreatic resections took 4 min ± 1.6 min SD to complete per case [24]. In an electronic SR used in kidney cancer surgery, a mean completion time (mean time (minutes:seconds)) of 2:04 was found in SRs and 2:36 in NRs [20]. SR completion times after Roux-en-Y gastric bypass were significantly shorter than NR completion times (mean time (minutes: seconds) ± SD; SR 3:55 ± 1:26 SD and NR 4:50 ± 0:50 SD, $p=.007$) [27].

Three studies focusing on the readability of the operative report recorded shorter mean data extraction times in SRs compared to NRs in colon cancer surgery (mean time (minutes:seconds) SR 2:32 ± 0:44 SD and NR 4:01 ± 1:14 SD, $p<.01$), rectal cancer surgery (mean time (minutes: seconds); SR 2:45 ± 1:36 SD and NR 4:48 ± 1:32 SD, $p<.001$), and laparoscopic cholecystectomy (SR 124 s and NR 156 s) [19, 22, 23].

Discussion

In this review, we compared the completeness and user-friendliness of two surgical reporting techniques (SR and NR). All published studies comparing the two reporting

designs have consistent conclusions. Overall completion and completion of subsections of the operative report were higher in SR. Subsequently, the time until completion and extraction of the operative report was shorter in SR. One exception to our findings was the specific details concerning the operative procedure, as this was reported generally higher in NRs. The main reason for this occurrence is most likely the lack of an extra comments section in most SR templates, in which the operator is able to report nonstandard, yet important events that have occurred during surgery.

Synoptic reporting methods were developed as a result of the lack of essential information in the NR. Despite the fact that new reporting techniques are being used more frequently, obtainment of scientific evidence regarding the extent of the added value and advantages of the SR was needed to promote further incorporation of synoptic reporting methods.

In 1994, a study was conducted on medical record keeping in which 70% of notes written by consultants were indecipherable in its present form by the nurse or junior doctor collecting the data [29]. To make usage of these poorly dictated or typed operative reports redundant, hospitals have implemented new reporting methods of which the Web-based reporting technique is the most commonly used computerized SR. It is designed to be user-friendly, and it can save data much faster and easier than the NR. Web-based reports, such as WebSMR (Surgical Medical Record), allow surgeons to securely access reports in the operating room or any other place connected to the Internet. It contains questions with drop-down menus and other functionalities, such as risk factor calculators and mandatory response fields for essential operative steps, to achieve a most comprehensive overview of the surgical procedure [30].

Limitations

The included articles focus on a diversity of surgical specialties, and just a few of these studies had similar surgical specialties [17–19, 21, 25, 28]. This could complicate the generalizability of the study outcomes. Seven articles were of moderate quality, which means that a proper understanding and comparability of these non-randomized studies are not fully ascertained. This could affect the interpretation and the quality of the data as presented [13–15, 18, 25–27]. Furthermore, we noticed that most articles compared a retrospective NR group to a prospective SR group. This way, it could be more difficult to accurately compare the two reporting methods, which might subsequently result in selection and information biases. Only a few articles were included with prospective comparisons of both reporting methods.

The analyzed data were not detailed enough to perform a pooled analysis. The previously mentioned differing surgical settings and comparison methods were also reasons not to pool the low number of studies. Each article utilized its own definitions for the different subsections in the operative reports, and these were not consistent between all studies.

Furthermore, it should be discussed that not all quality improvement projects on SR are published, which could result in higher risk of publication bias.

In general, all included studies favored SR. Nevertheless, advantages of NR and disadvantages of the current form of SR were also extensively reported. The use of mandatory fields in SRs resulted in more complete reporting with completion rates close to 100%. The use of these fields is most likely the major contributor to the high disparity in completion rates between NRs and SRs. We noticed that SRs without mandatory fields showed a reduced yet still considerable difference between the two types of operative reports. Thus, the overall difference in completion rates favoring the SR can be detected in both SRs with and without mandatory fields.

Importantly, physicians could feel “forced” to use mandatory tools in this Web-based approach. This mindset might consequently result in less accurate reporting. However, feeling “forced” is not a physician’s main mode of thought. New implementations are not easy to get accepted by physicians due to the idea that there could be an increased workload related to data entry and a big impact on current surgeon practices which could eventually affect timely patient care [31]. This impact is, in reality, minimal and, as this review demonstrates, the time until completion and extraction of the reports is shorter. It is thus important to inform physicians about the advantages of SR.

Recommendations

Our review demonstrates that the current form of the NR lacks much information and that there is still much room for improvement in the SR. The included studies contain a wealth of information on pitfalls of and tricks for the implementation method of a new operative report. Having evaluated all recommendations, we can strongly emphasize that for the purposes of education, for dealing with any unintended consequences of surgery, and for those faced

with carrying out a subsequent operation, the description of exactly what was found, any unexpected findings such as anatomic variants, and any deviations from the planned procedure are all absolutely key to providing high-quality ongoing care to patients.

Taking into account the benefits and limitations of both reporting methods, a hybrid approach should be aimed for in which the SR and NR complement each other. In this approach, information can be stored without the use of mandatory fields for nonessential information with an additional narrative and/or video description of the procedure if possible. As mentioned before, it could be beneficial to implement an extra comments box for specific details and unusual observations as a standard section. By minimizing the variability of reporting across surgeons and by adding these important details to the current SR in a standardized way, abnormalities during surgery can be seen at a glance in this more extensive version of the SR.

Conclusions

Overall completeness of the SR is higher compared to the traditional NR. Likewise, subsections of the operative report show higher completion rates in the synoptic method. Furthermore, a much shorter time until completion and time until extraction was found in SRs, which could indicate higher user-friendliness. The narrative method generally demonstrated higher completion in specific details regarding the surgical procedure. A hybrid approach to the SR could give better completion rates and higher physician satisfaction.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interests.

Appendix

See Table 4.

Table 4 Literature search strategy

Embase (1950–April 6, 2018)	((((synop* OR template* OR structured* OR structural* OR structuriz* OR structuris* OR standardi* OR checklist) NEAR/3 (report* OR operati*-note* OR operati*-documentation* OR surg*-note* OR surg*-documentation*)) OR (quality NEAR/3 (operati* OR surg*) NEAR/3 reporting)):ab,ti) AND ('surgery'/exp OR 'surgeon'/exp OR 'operating room'/de OR (surger* OR surgical* OR surgeon* OR ((operati*) NEAR/3 (room* OR theat* OR note* OR documentation* OR report*))):ab,ti) NOT ([Conference Abstract]/lim OR [Letter]/lim OR [Note]/lim OR [Editorial]/lim) AND [english]/lim
Ovid MEDLINE (1950–April 6, 2018)	((((synop* OR template* OR structured* OR structural* OR structuriz* OR structuris* OR standardi* OR checklist) ADJ3 (report* OR operati*-note* OR operati*-documentation* OR surg*-note* OR surg*-documentation*)) OR (quality ADJ3 (operati* OR surg*) ADJ3 reporting)).ab, ti.) AND (exp Surgical Procedures, Operative/ OR exp surgeons/ OR exp Operating Rooms/ OR (surger* OR surgical* OR surgeon* OR ((operati*) ADJ3 (room* OR theat* OR note* OR documentation* OR report*))).ab, ti.) NOT (letter* OR news OR comment* OR editorial* OR congres* OR abstract* OR book* OR chapter* OR dissertation abstract*).pt. AND english.la.
Web of Science (1988–April 6, 2018)	TS=(((((synop* OR template* OR structured* OR structural* OR structuriz* OR structuris* OR standardi* OR checklist) NEAR/2 (report* OR operati*-note* OR operati*-documentation* OR surg*-note* OR surg*-documentation*)) OR (quality NEAR/2 (operati* OR surg*) NEAR/2 reporting))) AND ((surger* OR surgical* OR surgeon* OR ((operati*) NEAR/2 (room* OR theat* OR note* OR documentation* OR report*))))) AND DT=(article) AND LA=(english)
Cochrane Central (1998–April 6, 2018)	((((synop* OR template* OR structured* OR structural* OR structuriz* OR structuris* OR standardi* OR checklist) NEAR/3 (report* OR operati*-note* OR operati*-documentation* OR surg*-note* OR surg*-documentation*)) OR (quality NEAR/3 (operati* OR surg*) NEAR/3 reporting)):ab,ti) AND ((surger* OR surgical* OR surgeon* OR ((operati*) NEAR/3 (room* OR theat* OR note* OR documentation* OR report*))):ab,ti)
Google Scholar (1991–April 6, 2018)	"synoptic|structured|structural|structurized|structurised report|reporting"|"synoptic|structured|structural| structurised|standardized operative|operation|surgical note|documentation" surgery|surgical|surgeon|"operative|operating room|theater"

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